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b) a plurality of pillar-type protrusions provided on at least one face other than the heat receiving face of said column in such a manner that they are parallel to or at a predetermined angle against the heat receiving face, said plurality of pillar-type protrusions being configured to form at least one uninterrupted fluid flow path between respective pillar-type protrusions in a direction in which the cross-sectional width of said column changes.

5. The heatsink of claim 1, wherein the heat receiving face is spaced away from the nearest pillar-type protrusion(s).

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Done
~~6. The heatsink of claim 1, wherein said plurality of pillar-type protrusions are provided on the at least one face in such a manner that they are at a predetermined angle against the heat receiving face, wherein the vertical distance to the heat receiving face from the end of each of said pillar-type protrusions on a column side is shorter than that from the other end.~~

D3
9. The heatsink of claim 6, wherein the heat receiving face is spaced away from the nearest pillar-type protrusion(s).

EX
D3
15. A cooling apparatus comprising:
a heatsink comprising:

a) a column having a heat receiving face, wherein a cross section of said column has a shape whose sectional width decreases as it extends away from said heat receiving face; and

b) a plurality of pillar-type protrusions provided on at least one face other than the heat receiving face of said column in such a manner that they are parallel to or at a predetermined angle against the heat receiving face, wherein at least one continuous row of said pillar-type protrusions extend from said column at the same angle relative to said column, each of said pillar-type protrusions in said at least one continuous row extending from said column at the same vertical height; and

a cooling means mounted on said heatsink.

17. The cooling apparatus of claim 15, wherein the heat receiving face is spaced away from the nearest pillar-type protrusion(s).

SEE APPENDIX FOR CHANGES MADE TO THE CLAIMS

Please add the following new claims:

--25. The heatsink of claim 1, wherein the at least one face of said column forms a curve extending from the bottom of said column to the top of said column.

26. The heatsink of claim 1, wherein at least one continuous row of said pillar-type protrusions extend from said column at the same angle relative to said column, each of said pillar-type protrusions in said at least one continuous row extending from said column at the same vertical height.

27. The heatsink of claim 1, further comprising a blower coupled to said column for blowing fluid in said direction in which the cross-sectional width of said column changes.

28. The heatsink of claim 1, wherein said respective pillar-type protrusions face each other.

29. A cooling apparatus, comprising:

a heatsink comprising:

a column having a heat receiving face and at least one side face which is not parallel to said heat receiving face; and

a plurality of fins provided on said at least one side face in such a manner that they are parallel to or at a predetermined angle against the heat receiving face; and

a blower coupled to said heat sink for forcing fluid through fluid flow passages defined between said plurality of fins.--

I. ELECTION/RESTRICTION

The Examiner requests clarification as to which depicted cross-sectional species shown in Figures 2c-2e is to be elected. In response, Applicants hereby elect Figure 2d.

II. CLAIMS 5-9, 17 AND 22 ARE DEFINITE

Claims 5-9, 17 and 22 stand rejected under 35 U.S.C. § 112, second paragraph. In order to expedite prosecution, claims 5, 6, 9 and 17 have been amended so as to obviate

the alleged indefiniteness. It is submitted that claims 5, 6, 9 and 17, as amended, are definite. Accordingly, it is respectfully requested that the rejection of claims 5-9, 17 and 22 under 35 U.S.C. § 112, second paragraph, be withdrawn.

III. CLAIMS 1, 5 AND 24 ARE NOT ANTICIPATED BY ELGAR ET AL.

Claims 1, 5 and 24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Elgar et al.. This rejection is respectfully traversed for the following reasons.

A. Claims 1 and 5

It is respectfully submitted that the Examiner's reliance on an intermediate product taught by Elgar et al. as anticipating the final product recited in claim 1 is improper. Elgar et al. specifically modifies the heat sink shown in Figure 1 so as to provide the "splayed" fins 33 and 34, to thereby interrupt fluid flow by causing flow to enter circuitous routes. That is, Elgar et al. desires flow paths 18 shown in Figure 1 to become "interrupted" by the splayed fins 33, 34. Accordingly, it is respectfully submitted that Elgar et al. does not desire the intermediate product relied on by the Examiner, and therefore does not disclose such an incidental intermediate product as an operable final product.

Nevertheless, in order to expedite prosecution, claim 1 has been amended to clarify the distinction between the present invention and Elgar et al.. Claim 1 recites in pertinent part, "said plurality of pillar-type protrusions being configured to form at least one uninterrupted fluid flow path between respective pillar-type protrusions in a direction in which the cross-sectional width of said column changes." In contrast, the fluid flow paths of Elgar et al. are all purposely "interrupted" (see page 3, lines 5-8). Furthermore, even in the intermediate product relied on by the Examiner (i.e., Figure 1 with cross-wise cuts),

the intended fluid flow path would extend in the same direction as the flow passages 18 shown in Figure 1 so that any alleged uninterrupted flow path of the intermediate product would not extend "in a direction in which the cross-sectional width of said column changes." That is, the cross-sectional width in the direction of the intended flow passages 18 does not change. It should be noted that all fluid flow passages 18 of Elgar et al. extend across the longitudinal direction of the heatsink (i.e., parallel to the heat face).

As anticipation under 35 U.S.C. § 102 requires that each and every element of the claim be disclosed in a single prior art reference, *Akzo N.V. v. U.S. Int'l Trade Commission*, 808 F.2d 1471 (Fed. Cir. 1986), and because Elgar et al. does not disclose or suggest, *inter alia*, "said plurality of pillar-type protrusions being configured to form at least one uninterrupted fluid flow path between respective pillar-type protrusions in a direction in which the cross-sectional width of said column changes" as recited in claim 1, it is submitted that Elgar et al. does not anticipate claim 1, nor any claims dependent thereon. Based on the foregoing, it is submitted that claims 1 and 5 are patentable over Elgar et al.. Accordingly, it is respectfully requested that the rejection of claims 1 and 5 under 35 U.S.C. § 102(b) over Elgar et al., be withdrawn.

B. Claim 24

The Examiner's basis for rejecting claim 24 is not entirely understood. Applicants filed a Supplemental Response dated August 22, 2001 which separately argued for the patentability of claim 24. The arguments presented in the Supplemental Response were in response to the non-responsive letter dated August 13, 2001 sent by the Examiner which requested Applicants to point out why claim 24 was patentable. However, in the outstanding Office Action, the Examiner does not appear to acknowledge the arguments

made in the Supplemental Response. The relevant portion of those arguments are reprinted below for the Examiner's convenience:

Further, with respect to Elgar et al., it is submitted that Elgar et al. does not disclose or suggest "a plurality of protrusions ... being separated from each other by a plurality of first gaps and a plurality of second gaps, said first gaps being disposed parallel to said heat receiving face and said second gaps being disposed transversely to said heat receiving face, wherein said second gaps are configured to form paths for up-down air flow."

...

Elgar et al. does not disclose or suggest "second gaps being disposed transversely to said heat receiving face", let alone second gaps "configured to form paths for up-down air flow" as recited in claim 24. As shown in Figure 2 of Elgar et al., there are no air-flow gaps located between respective fins that run transverse to the heating receiving face. Instead, each fin 33 has a splayed fin 34 located immediately adjacent thereto, thereby preventing "up-down air flow."

Accordingly, the device of Elgar et al. does not disclose or suggest the more efficient multi-air flow path configuration (i.e., horizontally and vertically throughout the heatsink) as provided by the present invention and recited in claim 24.

As discussed above with respect to claim 1, the air-flow passages 18 of Elgar et al. are configured to direct air parallel to the heat-receiving face in either the intermediate product or the final product. Moreover, even in the intermediate product, any two fins in a given row do not form gaps therebetween which are "configured to form paths for up-down air flow" as recited in claim 24. Any alleged gaps between such fins would be negligible in view of the express teachings of Elgar et al. and NOT for affirmatively producing legitimate air flow paths for up-down air flow as recited in claim 24. The only intended air flow passages are in the same direction as passages 18, regardless whether the intermediate or final product of Elgar et al. is considered.

As anticipation under 35 U.S.C. § 102 requires that each and every element of the claim be disclosed in a single prior art reference, Akzo N.V. v. U.S. Int'l Trade

Commission, 808 F.2d 1471 (Fed. Cir. 1986), and because Elgar et al. does not disclose or suggest, *inter alia*, "said protrusions being separated from each other by a plurality of first gaps and a plurality of second gaps, said first gaps being disposed parallel to said heat receiving face and said second gaps being disposed transversely to said heat receiving face, wherein said second gaps are configured to form paths for up-down air flow" as recited in claim 24, it is submitted that Elgar et al. does not anticipate claim 24.

Based on the foregoing, it is submitted that claim 24 is patentable over Elgar et al.. Accordingly, it is respectfully requested that the rejection of claim 24 under 35 U.S.C. § 102(b) over Elgar et al., be withdrawn.

IV. CLAIMS 1, 5-7, 9, 15, 17, 19, 22 AND 24 ARE NOT ANTICIPATED BY MARTON

Claims 1, 5-7, 9, 15, 17, 19, 22 and 24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Marton. This rejection is respectfully traversed for the following reasons.

A. Claims 1 and 24

Claims 1 and 24 are submitted to be patentable over Marton for reasons similar to those discussed above with respect to Elgar et al.. In particular, as shown in Figure 4, the flow ducts defined between segments 12 and 13 are configured so that air flows in a direction in which the cross-sectional width of the column does NOT change (i.e., the ducts formed by the two heat sinks extend in a direction which is perpendicular to the paper), and furthermore, the fins of two adjacent rows are positioned alternatively so as to interrupt flow in an up-down direction (*see* col. 3, lines 40-42).

B. Claim 15

Claim 15 recites in pertinent part, "a cooling means *mounted on* said heatsink" (emphasis added). Although the embodiment of Marton relied on by the Examiner (Figure 4; col. 3, lines 33-45) discloses that the "circular heat sink ... offers a convenient combination with a fan having the same diameter", it is submitted that such disclosure does NOT necessitate that the fan be "mounted on" the heatsink. It is entirely possible that the combined fan is spaced away from the heat-sink as a separate unit. As is well known, a proper rejection under § 102 requires that each and every element of a claim be *necessarily* present in a single prior art reference. In the instant case, Marton is completely silent as to any potential mechanical connection between the fan and the heatsink.

In fact, one of the asserted benefits of the device of Marton is the elimination of the need for *forced flow* of the cooling medium (see, e.g., col. 2, lines 1-5). Accordingly, Marton suggests that if a fan is indeed used in combination with the heatsink, such fan would NOT be mounted to the heatsink because it may not ultimately be needed. The heatsink would therefore be more easily moved, transferred, etc., without having a requisite fan mounted thereon which would require detachment, etc..

Based on the foregoing, it is submitted that claims 1, 5-7, 9, 15, 17, 19, 22 and 24 are patentable over Marton. Accordingly, it is respectfully requested that the rejection of claims 1, 5-7, 9, 15, 17, 19, 22 and 24 under 35 U.S.C. § 102(b) over Marton, be withdrawn.

**V. CLAIMS 4, 15, 17, 19-21 AND 23 ARE PATENTABLE OVER
ELGAR ET AL. IN VIEW OF LIN**

Claims 4, 15, 17, 19-21 and 23 stand rejected under 35 U.S.C. § 103 as being unpatentable over Elgar et al. in view of Lin. This rejection is respectfully traversed for the following reasons.

With respect to claim 15, even assuming *arguendo* that the Examiner's reliance on the intermediate product of Elgar et al. is proper, it is submitted that the prior art does NOT provide any motivation for providing the fan of Lin into the intermediate product of Elgar et al.. As discussed above, Elgar et al. expressly discloses the desire of having the fins 33, 34 splayed so as to produce circuitous flow. Any modification of Elgar et al. with the teachings of Lin (i.e., to incorporate the fan into the device of Elgar et al.), absent improper hindsight reconstruction, would necessarily place the fan on the heat-sink as shown in Figure 2 of Elgar et al.. In other words, the prior art does not provide any motivation or suggestion for using the intermediate product as relied on by the Examiner as an operable heatsink. On the contrary, Elgar et al. expressly teaches away from using the intermediate product as discussed above.

As is well known in patent law, a *prima facie* showing of obviousness can only be established if the prior art "suggests the desirability" of the proposed combination using *objective* evidence. The Examiner is directed to MPEP § 2143.01 under the subsection entitled "Fact that References Can Be Combined or Modified is Not Sufficient to Establish *Prima Facie* Obviousness", which sets forth the applicable standard:

The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. (*In re Mills*, 16 USPQ2d 1430 (Fed. Cir. 1990)).

In the instant case, even assuming *arguendo* that Elgar et al. can be modified by Lin so as to add a fan to the intermediate product, it is submitted that the "mere fact that [Elgar et al. and Lin] can be combined ... does not render the resultant combination obvious" because nowhere does the *prior art* "suggest the desirability of the combination" as set forth by the Examiner. The Examiner has not provided any *objective* evidence that the *cited prior art* suggests the "desirability of the proposed combination" as required for a proper rejection under 35 U.S.C. § 103. The Examiner is further directed to MPEP § 2143.01 under the subsection entitled "Fact that the Claimed Invention is Within the Capabilities of One of Ordinary Skill in the Art is Not Sufficient by Itself to Establish *Prima Facie* Obviousness", which sets forth the applicable standard:

A statement that modifications of the prior art to meet the claimed invention would have been [obvious] because the references relied upon teach that all aspects of the claimed invention were *individually* known in the art is *not* sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. (citing *Ex parte Levengood*, 28 USPQ2d 1300 (Bd. Pat. App. & Inter. 1993)).

In the instant case, even assuming *arguendo* that Elgar et al. and Lin "teach that all aspects of the claimed invention [are] individually known in the art", it is submitted that such a conclusion "is not sufficient to establish a *prima facie* case of obviousness" because there is no *objective* reason on the record to combine the teachings of the cited prior art.

In contrast, as previously mentioned, Elgar et al. teaches away from a fin arrangement whereby "at least one continuous row of said pillar-type protrusions extend from said column at the same angle relative to said column, each of said pillar-type protrusions in said at least one continuous row extending from said column at the same vertical height" as recited in claim 15. In view of the foregoing, it is submitted that the

prior art does-not provide the requisite rationale for adding a fan to the intermediate product of Elgar et al. Only Applicants' disclosure suggests the **combination** of a fan with the particular fin arrangement as recited in claim 15.

At best, the Examiner has attempted to show only that the elements (i.e., fin arrangement and fan) of the claimed invention are **individually** known without providing a *prima facie* showing of obviousness that the **combination** of elements recited in the claims is known or suggested in the art. For all the foregoing reasons, it is submitted that the proposed combination of Elgar et al. and Lin is improper.

With respect to claims 20 and 21, even if a fan was added to Elgar et al., the fan would not be placed so as to face the heat receiving face (claim 20) or send wind thereto (claim 21) because, as discussed above, the air flow passages of Elgar et al. are parallel to the heat receiving face and there is no suggestion or motivation providing on the record for modifying such an arrangement. Based on all the foregoing, it is submitted that claims 4, 15, 17, 19-21 and 23 are patentable over Elgar et al. in view of Lin. Accordingly, it is respectfully requested that the rejection of claims 4, 15, 17, 19-21 and 23 under 35 U.S.C. § 103 over Elgar et al. in view of Lin, be withdrawn.

VI. **DEPENDENT CLAIMS**

Under Federal Circuit guidelines, a dependent claim is nonobvious if the independent claim upon which it depends is allowable because all the limitations of the independent claim are contained in the dependent claims, *Hartness International Inc. v. Simplimatic Engineering Co.*, 819F.2d at 1100, 1108 (Fed. Cir. 1987). Accordingly, as claims 1, 15 and 24 are patentable for the reasons set forth above, it is respectfully

submitted that all claims dependent thereon are also patentable (e.g., claims 8 and 23 are patentable over Marton in view of Lee for at least the reason that Marton does not anticipate claims 1 and 15, from which claims 8 and 23 depend, as relied on by the Examiner; i.e., the Examiner does not rely on Lee for overcoming the deficiency of Marton with respect to claims 1 and 15). Further, it is submitted that the dependent claims are independently patentable by adding novel features to the combination.

VII. NEW CLAIMS

New claims 25-28 are submitted to patentable based on their own merits, in addition to being dependent on novel independent claims. For example, with respect to claim 25, none of the cited prior art discloses "wherein the at least one face of said column forms a curve extending from the bottom of said column to the top of said column." For example, Marton disclose a curve section at the bottom of the column which does not extend to the top thereof.

With respect to claim 27, none of the cited prior art discloses "a blower coupled to said column for blowing fluid in said direction in which the cross-sectional width of said column changes." In contrast, Marton and Elgar et al. disclose fluid flow passages extending in a direction in which the cross-sectional width of the column does not change, and the fan of Lin blows air directly into the fins which extend perpendicularly from the flat heat face.

With respect to claim 28, none of the cited prior art discloses "wherein said respective pillar-type protrusions face each other." For example, the fins of Marton are formed on a surface alternatively so that fluid flow passages are not defined by fins which face each other.

With respect to claim 29, none the cited prior art discloses or suggests the *combination* of "a column having a heat receiving face and at least *one side face which is not parallel to said heat receiving face ...* " and a blower coupled to said heat sink for forcing fluid through fluid flow passages defined between said plurality of fins.

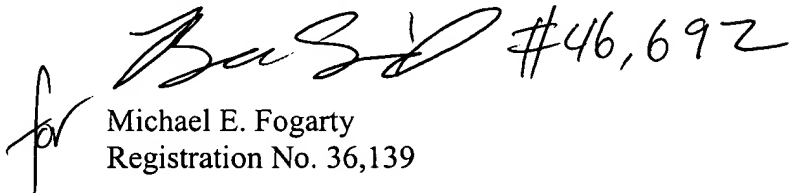
VIII. CONCLUSION

Having fully and completely responded to the Office Action, Applicants submit that all of the claims are now in condition for allowance, an indication of which is respectfully solicited. If there are any outstanding issues that might be resolved by an interview or an Examiner's amendment, the Examiner is requested to call Applicants' attorney at the telephone number shown below.

To the extent necessary, a petition for an extension of time under 37 C.F.R. 1.136 is hereby made. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account 500417 and please credit any excess fees to such deposit account.

Respectfully submitted,

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APPENDIX

1. (Thrice Amended) A heatsink comprising:

a) a column having a heat receiving face, wherein a cross section of said column has [one shape selected from trapezoid, triangle, and] a shape whose sectional width decreases as it extends away from said heat receiving face; and

b) a plurality of pillar-type protrusions provided on at least one face other than the heat receiving face of said column in such a manner that they are parallel to or at a predetermined angle against the heat receiving face, said plurality of pillar-type protrusions being configured to form at least one uninterrupted fluid flow path between respective pillar-type protrusions in a direction in which the cross-sectional width of said column changes [wherein at least one continuous row of said pillar-type protrusions extend from said column at the same angle relative to said column, each of said pillar-type protrusions in said at least one continuous row extending from said column at the same vertical height].

5. (Twice Amended) The heatsink of claim 1, wherein the heat receiving face [protrudes further outwards than said] is spaced away from the nearest pillar-type protrusion(s).

6. (Twice Amended) [A] The heatsink of claim 1, wherein said [comprising:

a) a column having a heat receiving face; and

b) a] plurality of pillar-type protrusions are provided on the at least one face [other than the heat receiving face of said column] in such a manner that they are [parallel to or] at a predetermined angle against the heat receiving face, wherein the vertical

distance to the heat receiving face from the end of each of said pillar-type protrusions on [the] a column side is shorter than that from the other end.

9. (Twice Amended) The heatsink of claim 6, wherein the heat receiving face [protrudes further outwards than said] is spaced away from the nearest pillar-type protrusion(s).

15. (Thrice Amended) A cooling apparatus comprising:

a heatsink comprising:

a) a column having a heat receiving face, wherein a cross section of said column has [one shape selected from trapezoid, triangle, and] a shape whose sectional width decreases as it extends away from said heat receiving face; and

b) a plurality of pillar-type protrusions provided on at least one face other than the heat receiving face of said column in such a manner that they are parallel to or at a predetermined angle against the heat receiving face, wherein at least one continuous row of said pillar-type protrusions extend from said column at the same angle relative to said column, each of said pillar-type protrusions in said at least one continuous row extending from said column at the same vertical height; and

a cooling means mounted on said heatsink.

17. (Twice Amended) The cooling apparatus of claim 15, wherein the heat receiving face [protrudes further outwards than said] is spaced away from the nearest pillar-type protrusions(s).